



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Applicant: Takahiro HAMADA et al.
Title: FUEL INJECTION VALVE
Appl. No.: 10/823,773
Filing Date: 04/14/2004
Examiner: Mahmoud Gimie
Art Unit: 3747
Confirmation Number: 4680

REPLY BRIEF

Commissioner for Patents
Mail Stop Appeals - Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply Brief is filed in response to the Examiner's Answer dated July 23, 2007, under the provisions of C.F.R. § 41.41. It is believed that no additional fee is required. If any fee is deemed to be insufficient, authorization is hereby given to charge any deficiency (or credit any balance) to the undersigned deposit account 19-0741.

ARGUMENT

I. The Board Should Reverse the Rejection Under 35 U.S.C. §103(a) Based Upon Dam

On pages 2-3 of the Examiner's Answer dated July 23, 2007, the Examiner has indicated that the rejection of claims 2-7 under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent 6,715,693 to Dam et al. (hereafter "Dam") has been withdrawn and that only the rejection of claim 1 under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent 6,715,693 to Dam et al. (hereafter "Dam") remains. Applicants respectfully traverse the

rejection of claim 1 for the reasons set forth in their Appeal Brief and for the additional reasons set forth below.

A. Claim 1

On pages 4 and 5 of the Examiner's Answer, the Examiner has referred to col. 2, ll. 1-10 of Dam as allegedly providing motivation for modifying Dam. As an initial matter, Applicants note that this passage refers to situations in which extreme wear within certain unlubricated fuel injectors creates rough areas which are so rough that additional fuel is leaked into the system. This passage appears in Dam's discussion of disadvantages of known fuel injection systems. Thus, if anything, Dam only teaches that roughness of such a degree that fuel flow through the injector cannot be controlled is undesirable. This passage adds nothing to suggest the desirability of the presently claimed surface roughness range or that would motivate a person of ordinary skill in the art to do anything other than reduce surface roughness to a level sufficiently low to avoid fuel leakage through the system. Accordingly, Applicants submit that these new comments from the PTO add nothing to resolve the fundamental deficiencies outlined in their Appeal Brief.

II. The Board Should Reverse the Rejection Under 35 U.S.C. §103(a) Based Upon Dam in View of Haji

The Examiner has rejected claims 2-7 under 35 U.S.C. §103(a) as allegedly being unpatentable over Dam in view of U.S. Patent 6,514,298 to Haji et al. (hereafter "Haji"). Applicants respectfully traverse this rejection for the reasons set forth in their Appeal Brief and for the additional reasons set forth below.

A. Claims 2-7

On page 6 of the Examiner's Answer, and with particular regard to claims 4-6, the Examiner has, for the first time during prosecution, referred to U.S. Patent 5,008,732 to Kondo *et al.* (hereafter "Kondo"). Applicants note that the PTO has not cited Kondo as forming any part of the outstanding rejections. Kondo adds nothing to resolve the fundamental deficiencies of Dam and Haji, and, in fact merely refers to liquid crystal displays

which include hard carbon films, diamond-like carbon films, amorphous hard carbon films, and microcrystalline hard carbon films. The PTO has provided no basis for considering a reference in the field of liquid crystal displays in the context of considering claims directed to fuel injection valves. Further, and with particular regard to claim 4, Applicants note that Kondo provides no disclosure related to regulating hydrogen content in a hard carbon film and certainly does not disclose or suggest the range of hydrogen contents recited in claim 4.

III. The Board Should Reverse the Rejection Under 35 U.S.C. §103(a) Based Upon Coffinberry

On page 3 of the Examiner's Answer dated July 23, 2007, the Examiner has indicated that the rejection of claims 2-7 under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent 6,156,439 to Coffinberry (hereafter "Coffinberry") has been withdrawn and that only the rejection of claim 1 under 35 U.S.C. §103(a) as allegedly being obvious over Coffinberry remains. Applicants respectfully traverse this rejection for the reasons set forth in their Appeal Brief and for the additional reasons set forth below.

A. Claim 1

On page 7 of the Examiner's Answer, the Examiner has stated that "Coffinberry does not specify the value of surface hardness, however teaches that the surface has an optimal surface roughness (col. 7 and l. 16)." The Examiner also stated that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to recognize an optimum range for the surface hardness as suggested by Coffinberry, since it has been held that discovering the optimum range involves only routine skill in the art, in re Aller, 105 USPQ 233" and further stated that "[t]he motivation to do so would have been to optimize surface roughness."

The conflation of surface hardness and surface roughness here is nonsensical, and the Examiner has provided no nexus that would suggest the relevance of an alleged teaching regarding surface roughness to surface hardness. This rationale set forth in the Examiner's Answer clearly cannot serve as a proper basis for a rejection under §103.

On page 11 of the Examiner's Answer, the Examiner continues to take the position that Coffinberry *teaches* a "hard carbon thin film coating on at least one of the sliding sections of the base materials of the needle valve and the opposite member." (Emphasis added). However, the PTO fails to address the difference between the claim language and the reference, i.e., the fact that the reference nowhere mentions or concerns coating a needle valve and an opposite member. As discussed in the first full paragraph on page 13 of Applicants' Appeal Brief, Coffinberry doesn't even relate to fuel injectors. The cover of the Coffinberry patent indicates that it is assigned to General Electric Company, and the disclosure appears to focus on problems caused by buildup of coke and gum on walls within jet and gas turbine engines. (See col. 2, line 65-col. 3, line 18). Although there is a passing reference to a fuel injector (See col. 3, line 14), there is no discussion of coating sliding structures within the fuel injectors or solving the problems addressed in the present patent application. The remainder of Coffinberry's disclosure discusses coatings on walls. (See col. 5, lines 13-25). Thus, Applicants also submit that Coffinberry fails to disclose or suggest "a hard carbon thin film coated on at least one of the sliding sections of the base materials of the needle valve and the opposite member" as recited in claim 1. (Emphasis added).

IV. The Board Should Reverse the Rejection Under 35 U.S.C. §103(a) Based Upon Coffinberry in View of Haji

The Examiner has rejected claims 2-7 under 35 U.S.C. §103(a) as allegedly being unpatentable over Coffinberry in view of Haji. Applicants respectfully traverse this rejection for the reasons set forth in their Appeal Brief and for the additional reasons set forth below.

A. Claims 2-7

On page 7 of the Examiner's Answer, and with particular regard to claims 4-6, the Examiner has, for the first time during prosecution, referred to U.S. Patent 5,008,732 to Kondo *et al.* (hereafter "Kondo"). Applicants note that the PTO has not cited Kondo as forming any part of the outstanding rejections. Kondo adds nothing to resolve the fundamental deficiencies of Coffinberry and Haji, and, in fact merely refers to liquid crystal displays which include hard carbon films, diamond-like carbon films, amorphous hard carbon films, and microcrystalline hard carbon films. The PTO has provided no basis for

considering a reference in the field of liquid crystal displays in the context of considering claims directed to fuel injection valves. Further, and with particular regard to claim 4, Applicants note that the Kondo provides no disclosure related to regulating hydrogen content in a hard carbon film and certainly does not disclose or suggest the range of hydrogen contents recited in claim 4.

CONCLUSION

For the additional reasons set forth above, Appellants respectfully request that the Honorable Board reverse all rejections contained in the Final Rejection.

Respectfully submitted,

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